Network Management Card & Modbus/ Jbus
(66103)

Installation manual

The **Network Management Card & Modbus/Jbus** (66103) is recommended for central UPSs protecting entire networks or for UPS units backing up critical loads. With the card installed, the UPS has its own IP address and uses the local computer capabilities to:

● Supply web pages (http or https (SSL)) with information on status conditions and measurements/settings/alarms,

● Integrate an SNMP-based NMS such as HP OpenView, IBM Tivoli Netview and Computer Associates Unicenter,

● Communicate with shutdown modules installed on the protected servers (Network Shutdown Module),

● Send e-mail and SMS messages,

● Control the ON/OFF function of the UPS and the outlets,

● Monitor the Environment Sensor (optional, cat. no. 66846).

UNPACKING AND CHECKS

● One **Network Management Card & Modbus/Jbus** (66103)
● One serial cable for configuration (34003918),
● One installation manual (34003906).
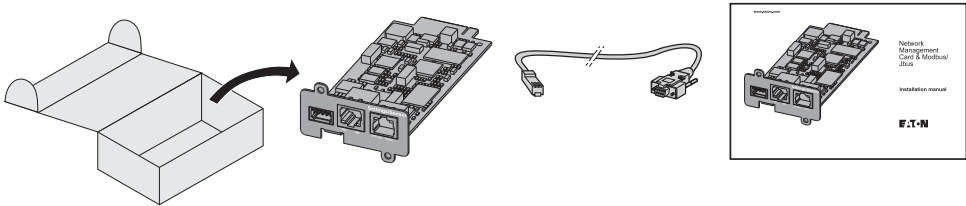
CHECK ON UPS VERSION

The Network Management Card & Modbus/Jbus (66103) is compatible with the Pulsar range UPSs available since 2006.Note.
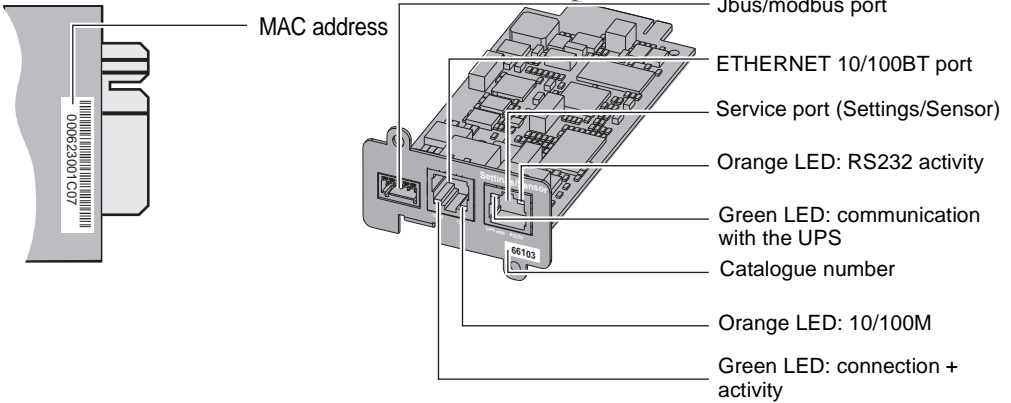

Important. Before installing the card, check that the UPS technical level (NT) is at least equal to that indicated in the table below.

UPS	Type	Technical level (NT)
Pulsar	700/1000/1500	02
Pulsar M	2200/3000	03
Pulsar MX	4000/5000/10000	04
Pulsar MX Frame	15/20 kVA	01

● If the technical level of the UPS is lower than that indicated in the table, contact EATON.

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OVERVIEW

MAC address

Jbus/modbus port

ETHERNET 10/100BT port

Service port (Settings/Sensor)

Orange LED: RS232 activity

Green LED: communication with the UPS

Catalogue number

Orange LED: 10/100M

Green LED: connection + activity

INDICATIONS

ETHERNET port

| LED	Colour	Status	Description
ACT	Green	● OFF ● ON ● Flashing	● Card not connected to network ● Card connected to network, but no activity ● Port is sending/receiving
100M	Orange	● OFF ● ON	● Port operating at 10 Mbits/s ● Port operating at 100 Mbits/s

Service port (Settings/Sensor)

LED	Colour	Status	Description
UPS Data	Green	● OFF ● ON ● Flashing	● Card starting ● Communicating with UPS ● Normal operation Communication with UPS is operational
RS232	Orange	● OFF ● ON ● Flashing	● Configuration menu activated ● Normal operation Configuration menu not activated ● Communication with Environment Sensor (option)

The **Network Management Card & Modbus/Jbus** (66103) can be hot-plugged on all UPSs from EATON equipped with a Minislot. It is not necessary to shutdown the UPS, disconnect the load or restart the UPS.

● Remove the plastic cover of the Minislot.
● Note the MAC address of the card before inserting it.
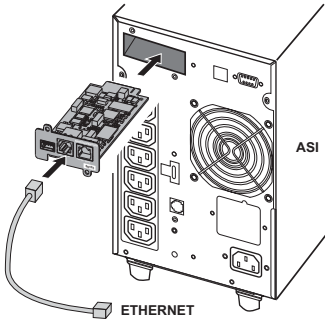
● Insert and secure the card with the screws.
● Connect the ETHERNET cable.
● Check the ETHERNET port indications.
● Wait until the UPS Data LED flashes regularly (approx. two minutes), indicating that card start-up has terminated correctly.

Note. Connection detection continues until the card has been connected to the network. Once connection is made, card start-up continues.

IP SETTINGS

Once the card has started, proceed as indicated below.
● Connect the serial cable to card's service port and PC's COM port
● Use a terminal emulator such as HyperTerminal^{TM} with these settings

Bits per second	Data bits	Stop bits	Parity	Flow control
9600	8	1	none	none

"Echo typed characters locally" option: disabled

● Type EATON (or eaton).
The main configuration menu is displayed:

```
EATON
NETWORK MANAGEMENT CARD
   1 : Reset
   2 : Network configuration
   3 : Set Login Password to Default
   4 : Return to Default Configuration
   5 : Jbus configuration
   6 : Sensor configuration
   0 : Exit
```

Your network is equipped with a BOOTP/DHCP server (default)

The card is configured by default with this service enabled. No manual configuration is required.The IP parameters are automatically collected by the card.

From the main configuration menu: (see above)
- **Press the 2 key (Network configuration).**
- **Press the 1 key(Read Network settings).**
The settings supplied by the server are displayed:

```
Network configuration :
    MAC address : 00:06:23:00:1C:07
    Mode : DHCP
    IP address : 172.17.23.18
    Subnet mask : 255.255.248.0
    Gateway : 172.17.17
```

- **Note the IP address.**
- **Press the 0 key (Exit).**
- **Press the 0 key (Exit).**
You can also use NMC Tool software utility to view the card IP adress
Provided on the Solution-Pac 2 CD-ROM or at www.eaton.com. It must be installed on a network connected PC.

Your network is not equipped with a BOOTP/DHCP server

Manual configuration is required.
To set the network configuration, use terminal emulation (see above)
From the main configuration menu:
- **Press the 2 key (Network configuration).**
- **Press the 2 key (Modify Network settings).**
- Follow the instructions and enter the IP parameters:

```
    1 : Read Network settings
    2 : Modify Network settings
    3 : Set ethernet speed
    0 : Exit
For each of the following questions, you can press "Return" to select
the value shown in braces, or you can enter a new value
Should this target obtain IP settings from the network?[N] N
Static IP address [172.17.16.16]?172.16.1.82
Subnet mask IP address [255.255.0.0]? 255.255.255.0
Gateway address IP address [0.0.0.0]? 172.17.17.1
Done
```

Wait until "Done" is displayed, indicating that the IP parameters have been saved.
- **Press the 0 key (Exit).**
- **Press the 1 key (Reset).**
- **Press the 2 key (Restart).**
 The card restarts with the new IP settings (after approx. one minute).

ACCESS TO SUPERVISION

To check whether the **Network Management Card & Modbus/Jbus** (66103) is operational after installation and configuration, proceed as follows.

● Run a browser
● Enter in the address bar:
http://IP address/ (e.g. http://172.16.1.82/)
● The home page is displayed

● **Set the time by clicking the Time command.**
● Continue configuration via the sections in the Settings menu.

USER MANUAL

This manual provides all the information required to install and configure the **Network Management Card & Modbus/Jbus** (66103).
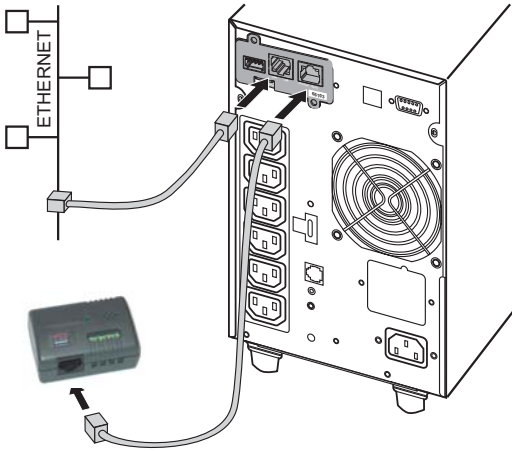
For more information on the supervision, control and configuration functions offered by the **Network Management Card & Modbus/Jbus** (66103), see the user manual on the **Solution-Pac 2** CD-ROM or in the Products/Power Management section of the **www.eaton.com/powerquality** site.

SENSOR CONNECTION (option)

The Environment sensor is a **Network Management Card & Modbus/Jbus** option. It is available from EATON (cat. no 66846).

The sensor remotely monitors the UPS environment by regularly measuring the temperature and humidity, and checking the states of two external contacts. It can also send alarms (e-mail, SNMP trap) tripped by pre-set thresholds.

Connection is made via the Service port (Settings/Sensor) on the **Network Management Card & Modbus/Jbus**. The sensor is detected automatically. Configuration and supervision use a menu that may be accessed directly from the home page. For more information, see the user manual of the **Network Management Card & Modbus/Jbus.**

JBUS/MODBUS

RS232 link configuration and connection

Pin	Function
1	Received data (input)
2	Not connected
3	Transmitted data (output)
4	Not connected
5	Signal ground

RS485 link configuration and connection

For proper operation, the polarity of EIA RS485 2-wire and 4-wire lines must be set at only one point and the lines terminated at the end.

Polarity

Normally, the master of the network sets the polarity of the line. The receiver inputs have a true failsafe feature wich eliminates the need for external bias resistors and ensures a logic high output level when the inputs are open or shorted. This guarantees that the receiver outputs are in a known state before communication begins and when communication ceases.

Termination

Termination is used to match impedance of a node to the impedance of the transmission line being used. When impedance are mismatched, the transmitted signal is not completely absorbed by the load and a portion is reflected back into the transmission line. The termination line is not necessary if the speed on the line is much less than 115Kbauds
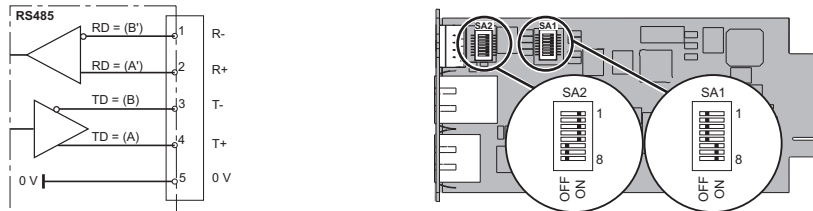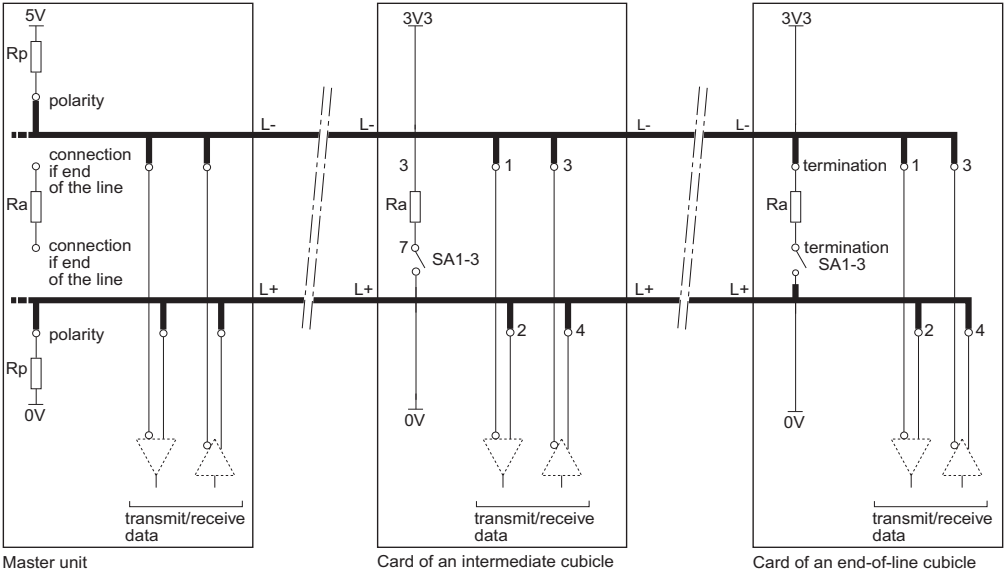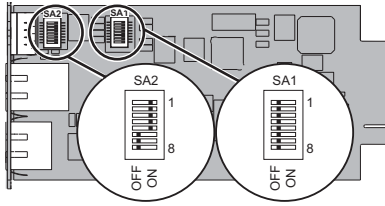

The default setting of the RS485 is a 4 wires configuration without polarity and without termination. SA1 switches are used to make the termination and the topology of the line (2 or 4 wires). The termination resistance value is 166 Ω.

SA1 description:

1 : reserved

2 : reserved

3 : link termination between T- to R- (2 wires configuration) if set to ON

4 : connection T- to R- (2 wires configuration) if set to ON

5 : connection T+ to R+ (2 wires configuration) if set to ON

6 : reserved

7 : reserved

8 : link termination between R+ and R- if set to ON

2 wires connection

L -   L +

SA2   SA1

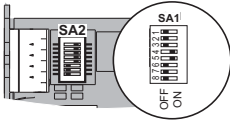| Master unit | Card of an intermediate cubicle | Card of an end-of-line cubicle |

5V

Rp

polarity

L-   L-

connection if end of the line

Ra

connection if end of the line

L+   L+

polarity

Rp

0V

transmit/receive data

Master unit

3V3

L-   L-

3   1   3

Ra

7   SA1-3

2   4

0V

transmit/receive data

Card of an intermediate cubicle

3V3

L-   L-

termination   1   3

Ra

termination SA1-3

2   4

0V

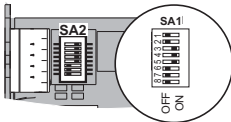transmit/receive data

Card of an end-of-line cubicle

Card settings of an intermediate cubicle

Link without polarity and without termination.

Others settings

Link with termination.

4 wires connection

5 4 3 2 1

T +   T -   R +   R-

SA2   SA1

SA2
1
8
OFF
ON

SA1
1
8
OFF
ON

Master unit

Rp — 5V
polarity

master transmitt

Rp — polarity
0V
transmit data

Rp — 5V
slave receiver

Ra — connection if end of the line
connection if end of the line

Rp — 0V
receive data

T-
T+
R-
R+

Card of an intermediate cubicle

slave receiver

R-
R+

1
Ra
2
receive data

slave transmitt

T-
T+

3
4
transmit data

R-
R+
R+
R-

T-
T+
T-
T+

Card of an end-of-line cubicle

slave receiver

R-
termination
Ra
termination
R+

1
2
receive data

slave transmitt

T-
T+

3
4
transmit data

Card settings of an intermediate cubicle
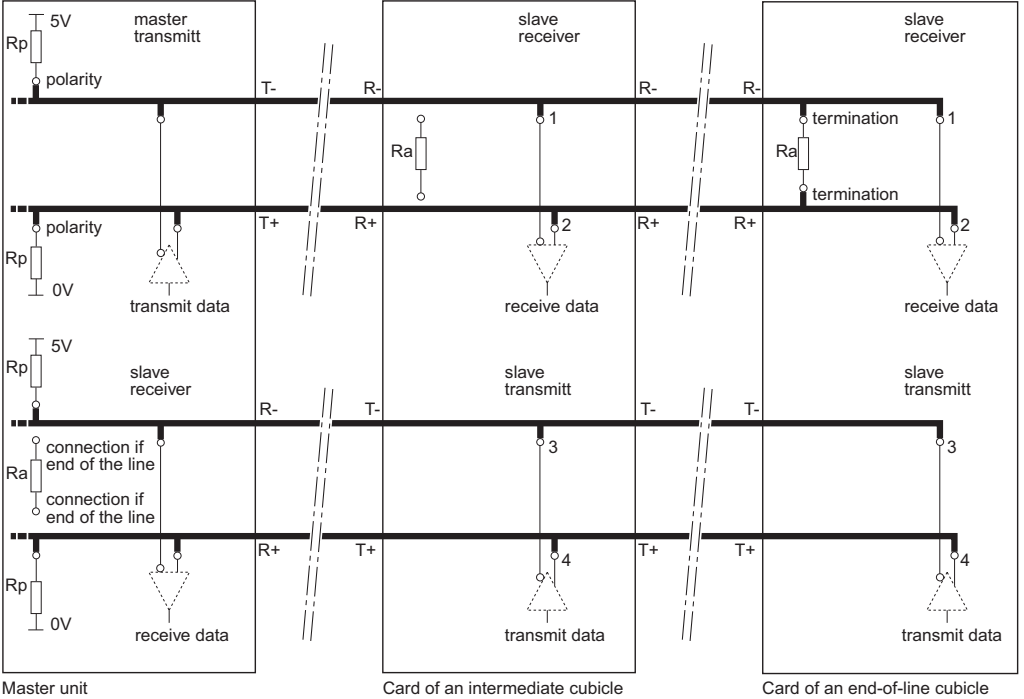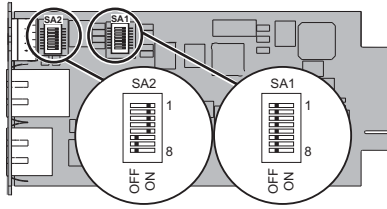

SA2   SA1
87654321
OFF
ON
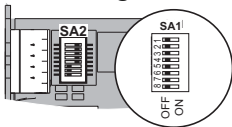
Link without polarity and without termination.

Others settings

SA2   SA1
87654321
OFF
ON

Link with termination.

Configuration of the JBUS/MODBUS communication parameters

Through settings port

**Connect the RS232 link to a terminal
(Microsoft Hyper terminal)**
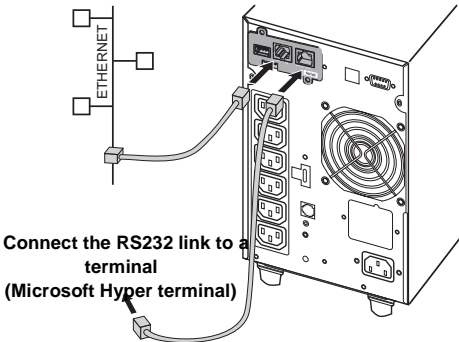
- Use the cord supplied with the card
- Connect the card to a computer
- Use a terminal emulator such as HyperTerminal^{TM} with these settings

Bits per second	Data bits	Stop bits	Parity	Flow control
9600	8	1	none	none

"Echo typed characters locally" option: disabled

- Check that UPS power is on.
- Type EATON (or eaton).

The main configuration menu is displayed:

```
EATON
NETWORK MANAGEMENT CARD
    1 : Reset
    2 : Network configuration
    3 : Set Login Password to Default
    4 : Return to Default Configuration
    5 : Jbus configuration
    6 : Sensor configuration
    0 : Exit
```

- **Press the 5 key (Jbus configuration).**

The Jbus configuration menu is displayed:

```
Jbus settings
    1 : Display Jbus settings
    2 : Modify Jbus settings
    3 : Display Jbus diagnostics
    4 : Reset  Jbus diagnostics
    5 : Return to Jbus Default Configuration
    6 : Display Jbus frames
    0 : Exit
```

- ● **Press the 2 key (Modifiy Jbus settings)**
- ● **Press «Return» key to modify the Jbus settings**

```
Setting Jbus configutration
    Set Slave number : 0x1*
Set the Baud Rate [1:38400,2: 19200, 3:9600, 4: 4800, 5: 2400,
6: 1200] :3
Set data format[1: 8 bits, 2: 7 bits] :1
Set stop bit[1: 1 bits, 2: 2 bits] :1
Set parity [1: None, 2: Even, 3: Odd] :1

Wait during the new setting is saved ...
TLS/Slave JBUS initialized
The Jbus configuration is now updated.
```

* Hex format.

- ● **Press the 0 key (Exit).**
- ● **Press the 0 key (Exit).**

Through a web browser

- ● Run a browser
- ● Enter in the address bar:
- **http://IP address/** (e.g. http://172.16.1.82/)
- ● The home page is displayed

- ● Select the setting menu

Network Management Card & ModBus/JBus

UPS	ModBus/JBus Settings		Help
UPS Properties	Pulsar M 2200		Computer Room
UPS Control			
Weekly Schedule	Slave Number (Hex) :	1	
Shutdown Parameters	Serial speed :	9600	
Logs and Notification	Data format :	8	
Measurements	Stop bit :	1	
Event Log	Parity :	None	
System Log			
Email Notification	Save modified settings :	Save	
Settings		Factory Reset	
Network			
System			
Notified Applications			
Access Control			
Time			
Firmware Upload			
ModBus/JBus serial			
Settings			

- ● **Set the parameters.**
- ● **Select the «Save» button to save the new parameters.**

TECHNICAL CHARACTERISTICS

Physical characteristics	
Dimensions (W x D x H)	132 x 66 x 42 mm
Weight	70 g
RoHS	100% compatible
Storage	
Storage temperature range	-10°C to 70°C
Ambient conditions	
Operating temperature range	0°C to 40°C
Relative humidity	90% RH max. without condensation
Card performance	
Supply voltage	5V ±5%
Supply current (all LEDs ON and Environment Sensor connected)	300 mA max.
Functions	
Web supervision	5 browsers max. (http), 3 browsers max. (https)
Languages	English, French, German, Italian, Spanish
Alarms	E-mail, SNMP TRAP, Web page
Log	400 measurements or events
Server protection	Up to 100 servers protected
Network	Fast ETHERNET, 10/100 Mbits, auto-negotiation HTTP 1.1, SNMP V1, NTP, TFTP, SMTP, BOOTP/DHCP
Identification	User name and password
Security	SSL 3.0, TLS 1.0
Browsers	Microsoft Internet Explorer 6.x or higher
NMS	Enterprise Power Manager (EPM) Management-Pac 2
MIB	MIB II standard - UPS EATON MIB V1.7
Settings (default values)	
IP network	BOOTP/DHCP enabled IP address: 172.17.16.16 (manual configuration) Subnet mask: 255.255.0.0 Gateway: 0.0.0.0 NTP server: pool.ntp.org
Web-page access control	User name: EATON Password: EATON
Service-port menu access control	Password: EATON or eaton (not modifiable)
Date and time	Synchronise with an NTP server (GMT)
Service port	9600 bits/s, 8 bits, 1 bit stop, no parity
RS485 port	Slave nb:0x01, 9600 bits/s, 8 bits, 1 bit stop, no parity

ELECTROMAGNETIC COMPATIBILITY

When correctly installed and used in accordance with manufacturer instructions, the card complies with the following standards:

● ITE (Information Technology Equipment) safety: IEC/EN 60950-1 2002
● EMC: EN 61000-6-2 (2002), EN 61000-6-3 (2002), IEC/EN 62040-2 (2002)

In compliance with European directives:

● Low voltage: 73/23/EEC and 93/68/EEC.
● EMC: 89/336/EEC and 93/68/EEC.

Federal Communication Commission (FCC) statement

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

WEB SITE

The information presented in this manual is also available in other languages in the download section of the EATON site **(www.eaton.com/powerquality)**.